

Supplementary material #2 for « Use of recurrence plots for identification and extraction of patterns in humpback whale song recordings »

Recording #3 from Abrolhos Archipelago, 2000, transcribed as a string of units

[illegible]

Extraction of the songs from the string of units : Manually by a trained analyst (left) and automatically by our routine (Right, bold letters)

MANUAL EXTRACTION

Partial song :

EFEFEFIIEFEFEFIIEFEFDF

Song 1 :

DKLDDKDDKLDDKLKJLDDKLKJDKLKDKLKLDDKLKDK
LKKLKPMMLKMLKMLMPMMLMLMPOMPMMOMMOMOM
MMOMMOMOMMMOMOMMMOMMOMABBBAAABBBAAABBB
AABBBAAABBBAAABBCDDCDFEFIIIEFEFIIIEGEFIIIEG
EFIIIEGEGIIIEGEGIIIEFEFIIIEGEGIIIEGEFEFIIIEFE
FEFIIIEFEFEFIIIEFEFEFEFEFEFEFIIIEFEFIIIEFEFI
IEFEFIIIEGEGIEGEGIIIEFEFIIIEFEFIIIEFEGIIIEGE
GIIIEGEGIIIEGEGIIIEFEFIIIEGEGIIIEGEGIIIEFEFII
EFEFEFIIIEFEFEFIIIEFEFEFEFEFEFEFEFEFEFEFEFE

Song 2 :

DKLDDKLJDDDLJDKLKLDDDKLKJDKLJDKLKLDDDKLJD
KLKKDKLKLMMKLMKLMKLMMLMMLMMPMMMMOMOMMM
MOMMOMOMPMMOMOMOBBAABBAABBAABBBBCDDCD
DCDFEFIIIEFEFIIIEGEGIIIEGEGIIIEFEFIIIEGEGIIIE
FEFIIIEGEGIIIEGEGIIIEFEFEFIIIEFEFEFIIIEFEFEF
IIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFEFIIIEFEFIIIE
GEGIEFEFIIIEFEFIEFEGIIIEFEGIIIEGEFIIIEFEFII
EFEFIIIEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFE
GIIIEGEGIIIEGEGIIIEGEGIIIEGEGIIIEGEGIIIEGEFEF
IIIEFEFEFIIIEFEFEFIIIEFEFDF

Song 3 :

DKLDDDKJDKLJDKLKLDDKLJDKLJDKLKKLPDDKLJD
KLKKLKLPMMKLMKLMKLMMPMMKLMMOMOMPMOMOMOM
PMMOMOMOMPMOMOMBBBBBABBBBAABBBBAABB
BAABBBBCDDCEFEFIIIEFEFIIIEFEGIIIEGEGIIIEGEGII
IEGEFIIIEFEFIIIEGEGIIIEFEFIIIEFEFEFIIIEFEFEF
IIIEFEFIIIEFEFIIIEFEGIIIEFEFEFIIIEFEGIIIEFEFI
IEFEFIIIEFEFIIIEFEGIIIEGEGEFIIIEFEFEFIIIEFEF
IIIEGEGIIIEGEFIIIEGEGIIIEGEFIIIEFEFIIIEGEGIIIE
GEFEFIIIEFEFEFIIIEFEFEFIIIEFEFDF

Song 4 :

DKLDDKLJDKLJDKLKLDDKLKJDKLJDKLKLMMKLMK
LMPPMMKLMMKMPPOMMOMMOMMOPMMOMOMOPMMO
MOMABBBABABBBAAABBAABBBAAABBAABBBAAABBA
ABBBAAABBCDDCEFEFIIIEFEGIIIEGEGIIIEGEGIIIEG
EGIIIEFEGIIIEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFI
IEFEFEFIIIEFEFIIIEGEFIIIEFEFIIIEFEFIIIEFEFI
EFEFIIIEFEFIIIEFEFIIIEGEGIIIEGEGIIIEGEGIIIEG
FEFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEF
FEFIIIEFEFEFIIIEFEFIIIEFEFIIIEFEFEFIIIEFEFEFIIIEF

AUTOMATED EXTRACTION

Partial song :

EFEFEFIIEFEFEFIIEFEF

Song 1 :

DFDKLDDKDDKLDDKLJLDDKLKJDKLKDCLKLDDKLK
DKLKKLKPMMLKMLKMLMPMLMMLMPOMPMOMMOMO
MPMMOMMOMOMMMOMOMMMOMABBBBAABBBAAAB
BBAABBBAAABBBABBCDDCDFEIIIEFEIIEGEFII
EGEFIIIEGEGIIIEGEGIIIEFEFIIIEGEGIIIEGEFEFII
FEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFEFII
FIIIEFEFIIIEGEGIIIEGEGIIIEFEFIIIEFEFIIIEFEFII
GEGIIIEGEGIIIEGEGIIIEFEFIIIEGEGIIIEGEGIIIEFEF
IIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFD

Song 2 :

DKLDDKLJDDDLJDKLKLDDKLKJDKLJDKLKLDDKLJD
KLKKDKLKLMMKLMKLMMLMMLMPMMMMOMOMMM
MOMMOMOMPMMOMOMOBBAABBAABBAABBBCCDDCD
DCDFEFIEFEFIEGEGIEGEGIEFEFIEGEGIE
FEFIEGEGIEGEGIEFEFEFIEFEFEFIEFEFEF
IEFEFEFIEFEFEFIEFEFEFIEFEFIEFEFIE
GEGIEFEFIEFEFIEFEGIEFEGIEGEFIEFEFII
EFEFIEFEFIEFEFEFIEFEFEFIEFEFEFIEFE
GIEGEGIEGEGIEGEGIEGEGIEGEGIEGEGIEFEF
IEFEFEFIEFEFEFIEFEFD

Song 3 :

DFDKLDDDKJDKLJDKLKDDKLJDKLJDKLKKLPDDKL
JDKLKKLKLPMMLMKLMKLMMPMKLMMOMOMPMOMOM
OMPMOMOMOMPMOMOMBBBBBABBBBAABBBAAABBBAA
BBBAABBBBCDDCEFEFIIEFEFIIEFEGIIEGEGIIEGE
GIIEGEFIIEFEFIIEGEGIIEFEGIIEFEFEFIIEFEF
EFIIEFEFIIEFEFIIEFEGIIEFEFEFIIEFEGIIEFE
FIIEFEFIIEFEFIIEFEGIIEGEGFIIEFEFEFIIEF
EFIIEGEGIIEGEFIIEGEGIIEGEFIIEFEFIIEGEGII
IEGEFEFIIEFEFEFIIEFEFEFIIEFEFD

Song 4 :

DFDKLDDKLJDKLJDKLKLDDKLKJDKLJDKLKLMMKL
MKLMMPPMKLMMKMPOMMOMMOMPMOMOMOMPM
MOMOMABBBABABBBABBBAAABBBAAABBBAAAB
BAABBBAAABBBCCDDCEFEFIIIEFEGIIIEGEGIIIEGEGII
EGEGIIIEFEGIIIEFEFIIIEFEFEFIIIEFEFEFIIIEFEFE
FIIIEFEFEFIIIEFEFIIIEGEGIIIEFEFIIIEFEFIIIEFEF
IIIEFEFIIIEFEFIIIEFEFIIIEGEGIIIEGEGIIIEGEGIIIE
GEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFEFEFII
FEFEFIIIEFEFEFIIIEFEFIIIEFEFEFIIIEFEFEFIIIEFEFE

Song 5 :

DKJDKLJDKLKLDDKLKJDKLJDKLKLDDKLKDKLKL
PMMKKLMKKLMMKKLMPMMLMMMMMMOMMOMOMPPMMOM
OMOMPMOMOBBAABBAABBAABBCDDCEFEFIIIEFEFI
IEGEGIIIEGFEFIIIEGFEFIIIEGEGIIIEGFEFIIIEGEGIIIEG
EGIIIEGFEFIIIEFEFIIIEFEFIIIEFEFEFIIIEFEFEFIIIE
FEFDF

Song 6 :

DDDKJDKLJDDKLKLDDKLKJDKLJDKLKLPMMLMLMM
KLMPMMKLMMOMPMOMMOMOMPMOMOMMOMPMOMOMOM
MOMPMAMABBAABBAABBAABBAABBAABBAABBAABBA
ABBAABBCDDCDFEFIIIEFEFIIIEGEGIIIEGEGIIIEG
EGIIIEGFEFIIIEGFEFIIIEGFEFIIIEFEFEFIIIEFEFEFI
IEFEFEFIIIEFEFEFIIIEFEFIIIEFEFIIIEFEFIIIEFEF
IIIEFEFIIIEFEFIIIEFEFIIIEGEGIIIEGEGIIIEGEGIIIE
GEFIIIEGEGIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFEF
EFIIIEFEFEFIIIEFEFIIIEFEFEFIIIEFEFEF

Song 7 :

DKDDFDFDKKDJLDDKLJDDKLKJDKLKLDDKLKDDKLJ
JLJLQLQMMKLMLMLMPMMKLMMKLMPMMOMMOMMOM
PMOMOMMOMPMOMOMOMPMOMOMOBBAABBAABBA
ABBCDDCDDCEFEFIIIEFEFIIIEGEGIIIEGEGIIIEGEF
EFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFDF

Song 8 :

DKJDKLDDKLJDKLJDKLJKLKLDDLKDKLJDKLKLPM
MLMLMLMPPMMLMMMPMMOMMOMMOMPMOMOMMOMPM
MOMOMOBBAABBAABBAABBAABBCDDCDFIIEFEFI
FEGIIIEGFEFIIIEGEGIIIEGFEFIIIEFEGIIIEGFEFIIIEF
EFEFEFIIIEFEFIIIEFEFIIIEFEFIIIEFEFIIIEFEFIIIE
GIIIEGEGFEFIIIEFEFIIIEGEGFEFIIIEFEFEFIIIEFEFEF
IIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFDFDF

Partial song

DKLDDKLKDDKLKDKLDKJDKLJDKLJDKKLKLLDDKLK
DDKLKDKLKLPMMLKLMLMPMMOMPMOMPMOMPMOM
MOMOMPM

Song 5 :

DFDJLDDKJDKLJDKLKLDDKLKJDKLJDKLKLDDKL
KDKLKLPMMLKLMLMPMMKLMMKLMPMMLMMMMMMOMMOMOM
PPMMOMOMPMOMOMOBBAABBAABBAABBCDDCEFEFI
IEFEFIIIEGEGIIIEGFEFIIIEGFEFIIIEGEGIIIEGFEFIIIEG
EGIIIEGEGIIIEGFEFIIIEFEFIIIEFEFIIIEFEFEFIIIEFE
FEFIIIEFEF

Song 6 :

DFDDDKJDKLJDDKLKLDDKLKJDKLJDKLKLPMMLML
MMKLMPMMKLMMOMPMOMMOMOMPMOMOMMOMPMOMOM
MOMOMPMAMABBAABBAABBAABBAABBAABBAABBAABBA
BAABBAABBCDDCDFEFIIIEFEFIIIEGEGIIIEGEGIIIEG
EGEGIIIEGFEFIIIEGFEFIIIEGFEFIIIEFEFEFIIIEFEFE
FIIIEFEFEFIIIEFEFEFIIIEFEFIIIEFEFIIIEFEFIIIEF
EFIIIEFEFIIIEFEFIIIEFEFIIIEGEGIIIEGEGIIIEGEGII
IEGFEFIIIEGEGIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEF
EFEFIIIEFEFEFIIIEFEFIIIEFEFEFIIIEFEFEF

Song 7 :

FDKDDFDFDKKDJLDDKLJDDKLKJDKLKLDDKLKDDKL
JLJLQLQMMKLMLMLMPMMKLMMKLMPMMOMMOMMOM
MPMMOMOMMOMPMOMOMOMPMOMOMOBBAABBAABBA
AABBCDDCDDCEFEFIIIEFEFIIIEGEGIIIEGEGIIIEGE
FEFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFDF

Song 8 :

DFDKJDKLDDKLJDKLJDKLJKLKLDDLKDKLJDKLKL
MMLMLMLMPPMMLMMMPMMOMMOMMOMPMOMOMMOM
PMOMOMOBBAABBAABBAABBAABBCDDCDFIIEFEFI
IEFEGIIIEGFEFIIIEGEGIIIEGFEFIIIEFEGIIIEGFEFIIIEF
EFEFEFEFIIIEFEFIIIEFEFIIIEFEFIIIEFEFIIIEFEFIIIE
GEGIIIEGEGFEFIIIEFEFIIIEGEGFEFIIIEFEFEFIIIEFEF
EFIIIEFEFEFIIIEFEFEFIIIEFEFEFIIIEFDF

Partial song

DFDKLDDKLKDDKLKDKLDKJDKLJDKLJDKKLKLLDDK
LKDDKLKDKLKLPMMLKLMLMPMMOMPMOMPMOMPMOM
MOMOMPM